

Table 131

The 1977 and projected industrial self-supplied withdrawal and consumption rates, in million-gallons-per-day.

<i>Industrial Self-Supplied</i>	1977	1980	1990	2000
Withdrawal	92.9	91.6	95.9	102.8
Consumption	16.7	18.0	23.8	30.9

Rural Self-Supplied Water An estimated 355,000 persons lived in areas supplied by individual water systems in 1975. An estimated 15.0 mgd was withdrawn for residential purposes in 1975. Additional residents and the increase in the standard of living are expected to increase rural residential water use to approximately 26.7 mgd by the year 2000.

An estimated 515,000 head of livestock and about 384,000 chickens were raised in Region Eight in 1975. Collectively, these animals consumed nearly 3.0 mgd. As the animal population increases, water consumption may increase to approximately 4.1 mgd by the year 2000. Rural self-supplied water is withdrawn from ground water supplied from wells on individual farms.

The total withdrawal of rural self-supplied water may increase from the current 19.1 mgd to approximately 30.9 by the year 2000 as indicated below.

Table 132

The 1977 and projected withdrawal and consumption rates for rural self-supplied water, in million-gallons-per-day.

<i>Rural Self-Supplied</i>	1977	1980	1990	2000
Withdrawal	19.1	20.6	25.7	30.9
Consumption	19.1	20.6	25.7	30.9

Irrigation Water Soil associations with irrigation potential are generally located along streams, especially the West Fork of the White River, Sugar Creek, and Big Blue River. Figure 165 shows the potential irrigation areas within the region.

Based upon the survey of irrigated lands, approximately 870 acres of croplands were irrigated in the region in 1977. Had 1977 been a normal growing year, agricultural land would have required about 2.5 mgd during the peak irrigation period of July and August. It is estimated that approximately 26,000 acres could be profitably irrigated in Region Eight. As much as 3,900 acres of croplands may be irrigated by the year 2000. This potential expansion of croplands is expected to increase the peak July–August irrigation demand in an “average” year to about 10.9 mgd. The average year increase in ground water use is expected to increase from 1.6 mgd to 6.8 mgd by the year 2000.

In addition to the irrigation for agricultural use, fairways and greens on the region’s many golf courses

are irrigated. About 5.5 mgd is applied to these areas during the peak July–August irrigation season. This demand is expected to increase to 10.4 mgd by the year 2000.

The total withdrawal for the irrigation of croplands and golf courses during the “average” irrigation season of 1977 was approximately 8.0 mgd. These withdrawals may increase to 21.3 mgd during the “average” growing season by 2000 as tabulated below.

Table 133

The 1977 and projected withdrawals of irrigation water for croplands and golf courses, in million-gallons-per-day.

<i>Irrigation</i>	1977	1980	1990	2000
Withdrawal	8.0	11.2	15.8	21.3
Consumption	8.0	11.2	15.8	21.3

Electric Energy There are four electric generating plants, all located along the West Fork of the White River. The four existing stations are Pritchard, Stout, Perry, and Noblesville. All of these stations use once-through cooling systems. Stout also uses a cooling tower on one of its units. Pritchard, Stout, and Perry are owned and operated by Indianapolis Power and Light Company. Noblesville is owned and operated by Public Service Indiana.

Stout, Pritchard, Noblesville, and Perry are rated at 954.0, 412.0, 111.0 and 58.5 megawatts respectively. Intake requirements for the four plants total 787.6 mgd. Stout withdraws 325 mgd, Pritchard withdraws 330 mgd, Noblesville withdraws 125 mgd and Perry withdraws 7.6 mgd. The Stout plant consumes water at the rate of 5.0 mgd.

There are no announced plans for any new generating facilities in Region Eight. Projections indicate that regional water withdrawals for generation of electricity will decline from 787.6 mgd to 257.0 mgd by the year 2000 as presented in the following table. Phase out of existing units is the reason for the anticipated reduction in water withdrawals.

Table 134

The 1977 and projected water withdrawal and consumption rates for the production of energy, in million-gallons-per-day.

<i>Energy</i>	1977	1980	1990	2000
Withdrawal	787.6	753.0	587.0	257.0
Consumption	5.0	5.0	4.0	4.0

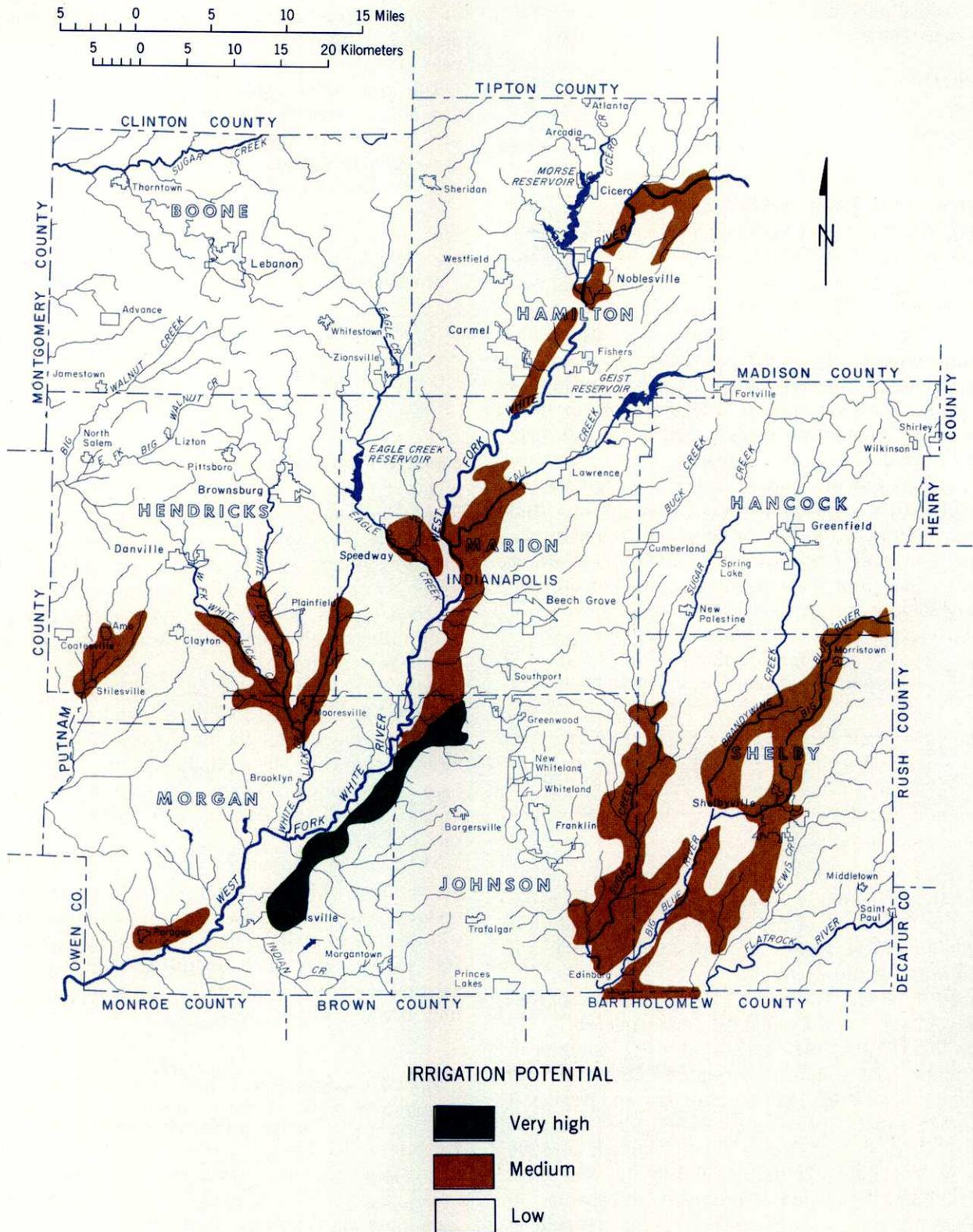


Figure 165
 Map of Region Eight showing the location of the soil associations that appear to possess an economic potential for the irrigation of croplands.

EXCESS WATER

Flooding

Approximately 126,800 acres of the region are subject to flooding. The major flood plains are shown in Figure 166. The region is drained predominantly by the West Fork of the White River, East Fork of the White River and a small portion of the Wabash River Basin. Figure 167 delineates the average annual flood damages along selected streams within the region. The average annual damages due to flooding were estimated in 1977 to be \$12,918,000, with fifty-eight percent occurring in urban areas.

Flood Control The flood control structures of the region include both dams and levees. The primary flood control dam is the Eagle Creek reservoir structure, which controls runoff from a drainage area of 162 square miles.

In addition to the Eagle Creek reservoir, the city of Indianapolis has constructed a comprehensive flood protection project on Eagle Creek. The stream channel has been enlarged from 21st Street to White River, and levees have been constructed along both banks with the exception of a short reach downstream from Kentucky Avenue and a short reach between Washington Street and the Pennsylvania Railroad.

The city of Indianapolis, with help from the U.S. Army Corps of Engineers, developed a comprehensive flood protection project along the West Fork of the White River. This project entailed enlarging the river's channel from West 38th Street on the north to West Raymond Street on the south. Levees and boulevard levees and flood walls have been constructed along the banks.

Further north on the West Fork of the White River, between Kessler Boulevard upstream to Broad Ripple Dam, levees have been constructed. Another levee has been constructed on the left bank of the West Fork of the White River at Rocky Ripple.

In order to alleviate flooding of Dry Run, a tributary to Little Eagle Creek, a diversion channel was constructed north of 25th Street to carry the additional water to Little Eagle Creek.

Fall Creek, which flows through southeastern Hamilton and northeastern Marion Counties, has several levees, boulevard levees, and floodwalls within the city of Indianapolis.

Flood Plain Management Participants in the emergency phase of the National Flood Insurance Program include unincorporated Boone, Hancock, Hendricks, Johnson, and Shelby Counties as well as the communities listed in Table 135. Bargersville, Fishers,

Morgantown, and Morristown are participating in the regular phase of the National Flood Insurance Program.

Table 135

Communities participating in the emergency phase of the National Flood Insurance Program.

Brooklyn	Mooreville
Carmel	New Whiteland
Cicero	Noblesville
Clay	Plainfield
Danville	Princes Lake
Edinburgh	Shelbyville
Franklin	St. Paul
Greenfield	Thorntown
Greenwood	Westfield
Indianapolis	Whitestown
Lebanon	Whiteland
Martinsville	Zionsville

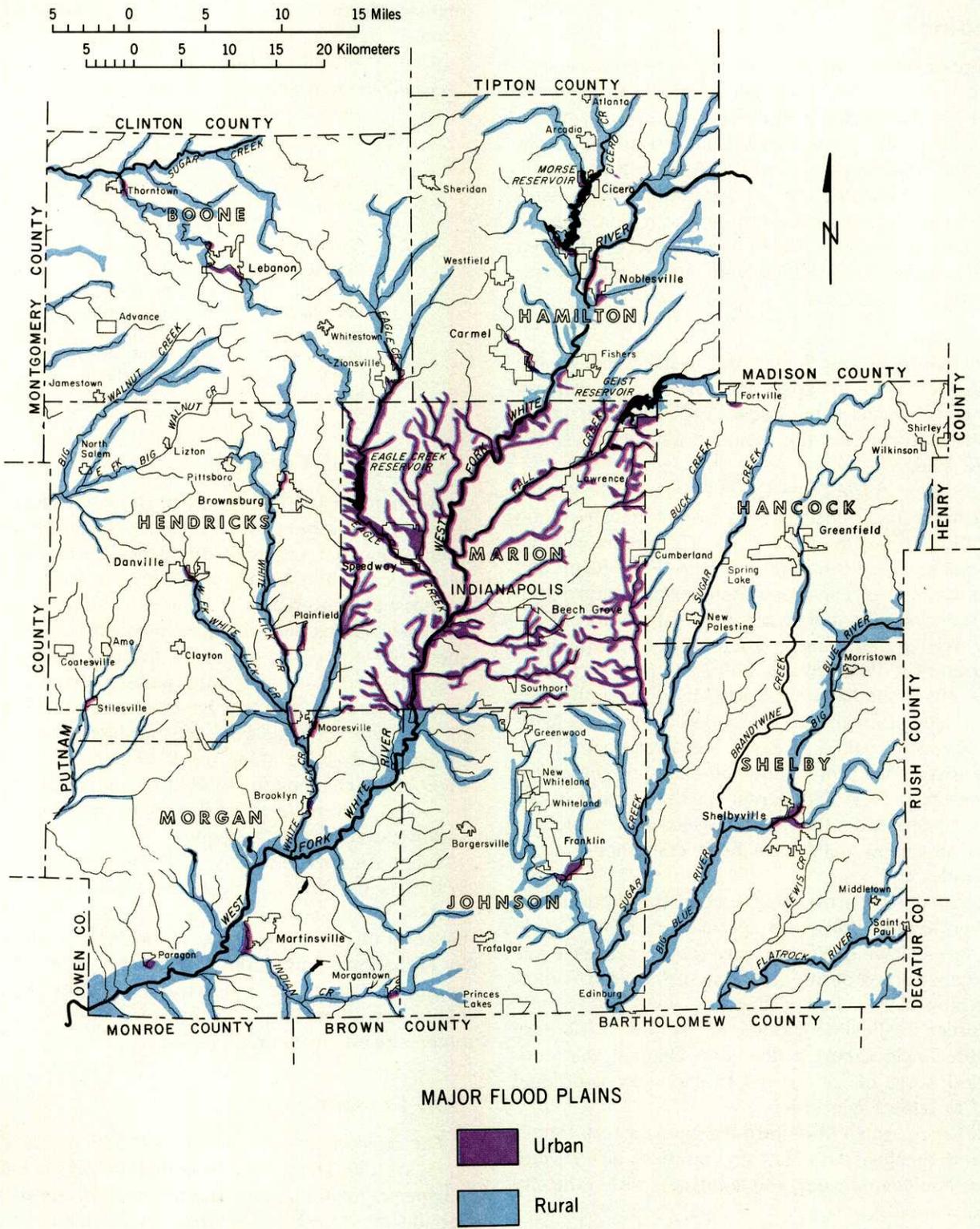
Agricultural Drainage

Approximately fifty percent of the soil associations in Region Eight have "severe" wetness characteristics, twenty-nine percent have "moderate" wetness characteristics, while twenty-one percent have "slight" wetness characteristics. The general location of the soil associations with these wetness characteristics is shown in Figure 168. Although the majority of lands are classified as having soil wetness characteristics, there are some areas that have soils of sufficient permeability to keep the land well drained. These areas include lands lying along the West Fork of the White River, the area along the Blue River and Sugar Creek in the southeastern corner of the region, and most of the southwest corner of the region.

There are approximately 3,235 miles of legal drains in the region, which serve as the main collectors and outlets for on-farm drainage systems. The maintenance of this system of legal drains is the responsibility of the local county drainage boards, or in a limited number of cases, of conservancy districts. No legal entity is responsible for maintaining drainage for the other streams in the region.

Soil Erosion

The erosion potential of soil associations are shown in Figure 169. Thirty percent of Region Eight is rated as having a "medium" soil erosion hazard. These areas for the most part are adjacent to the major streams and their tributaries. Ten percent of the land is classified as having a "high" soil erosion potential. These areas are located in the southeastern portion of the region. The remaining sixty percent of the region is rated as having a "low" potential erosion hazard for land in a fallow condition.

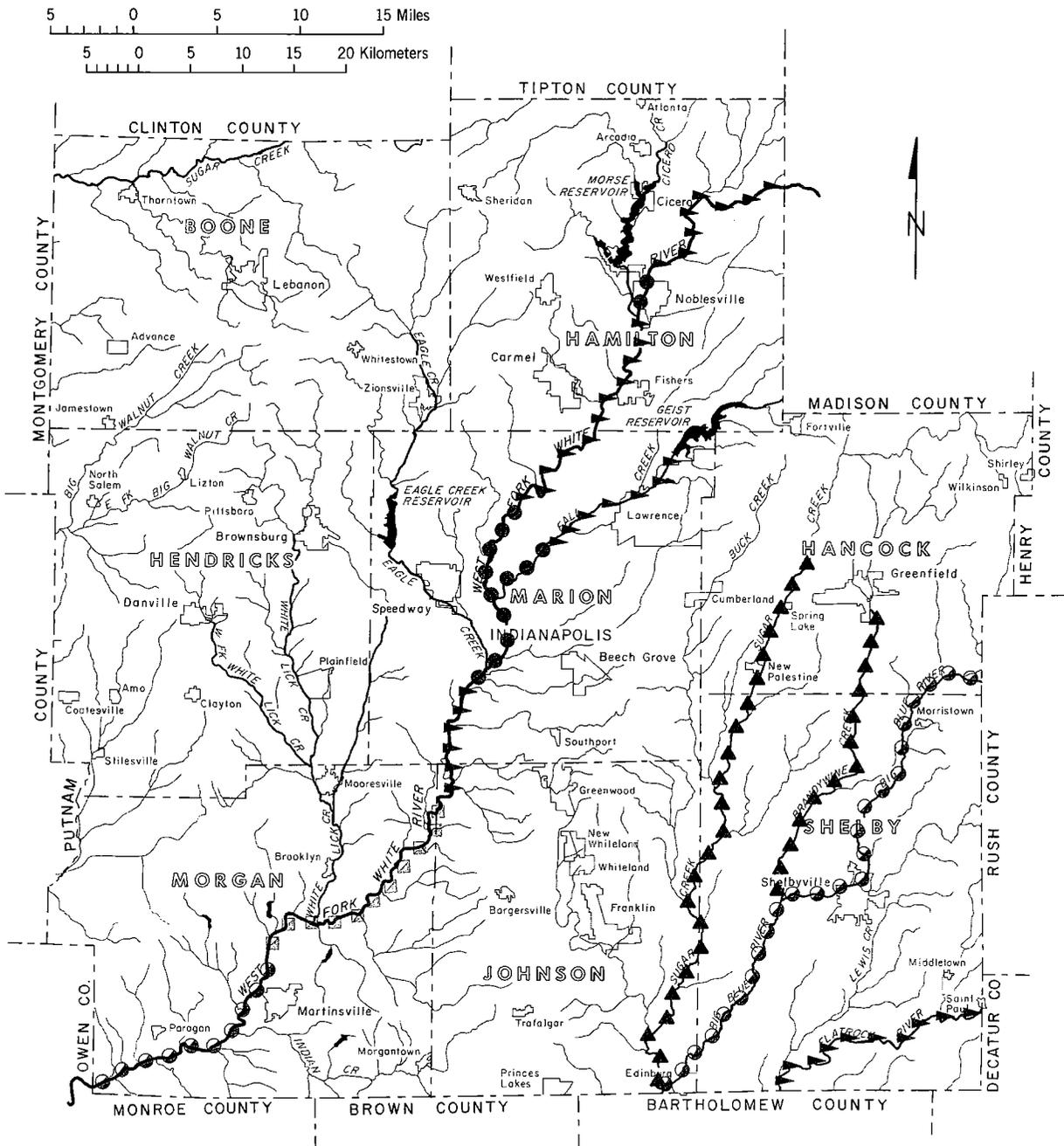


MAJOR FLOOD PLAINS

- Urban
- Rural

Figure 166

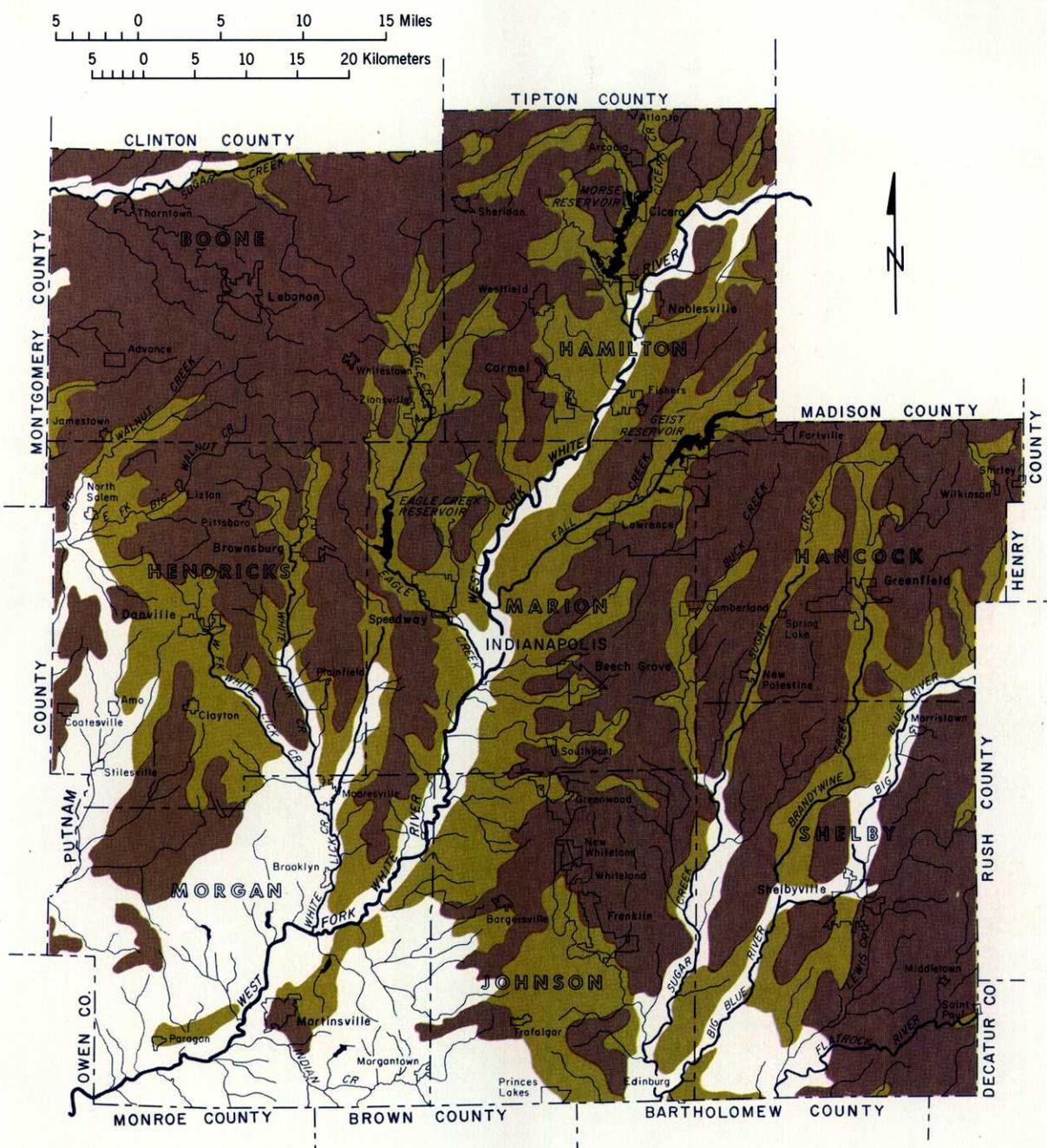
Map of Region Eight showing the major flood plains.



FLOOD PLAIN DAMAGES

- \$100,000 plus
- ◐ \$50,000-\$100,000
- ▶ \$10,000-\$25,000
- ◑ \$5,000-\$10,000
- ◻ \$0-\$2,500

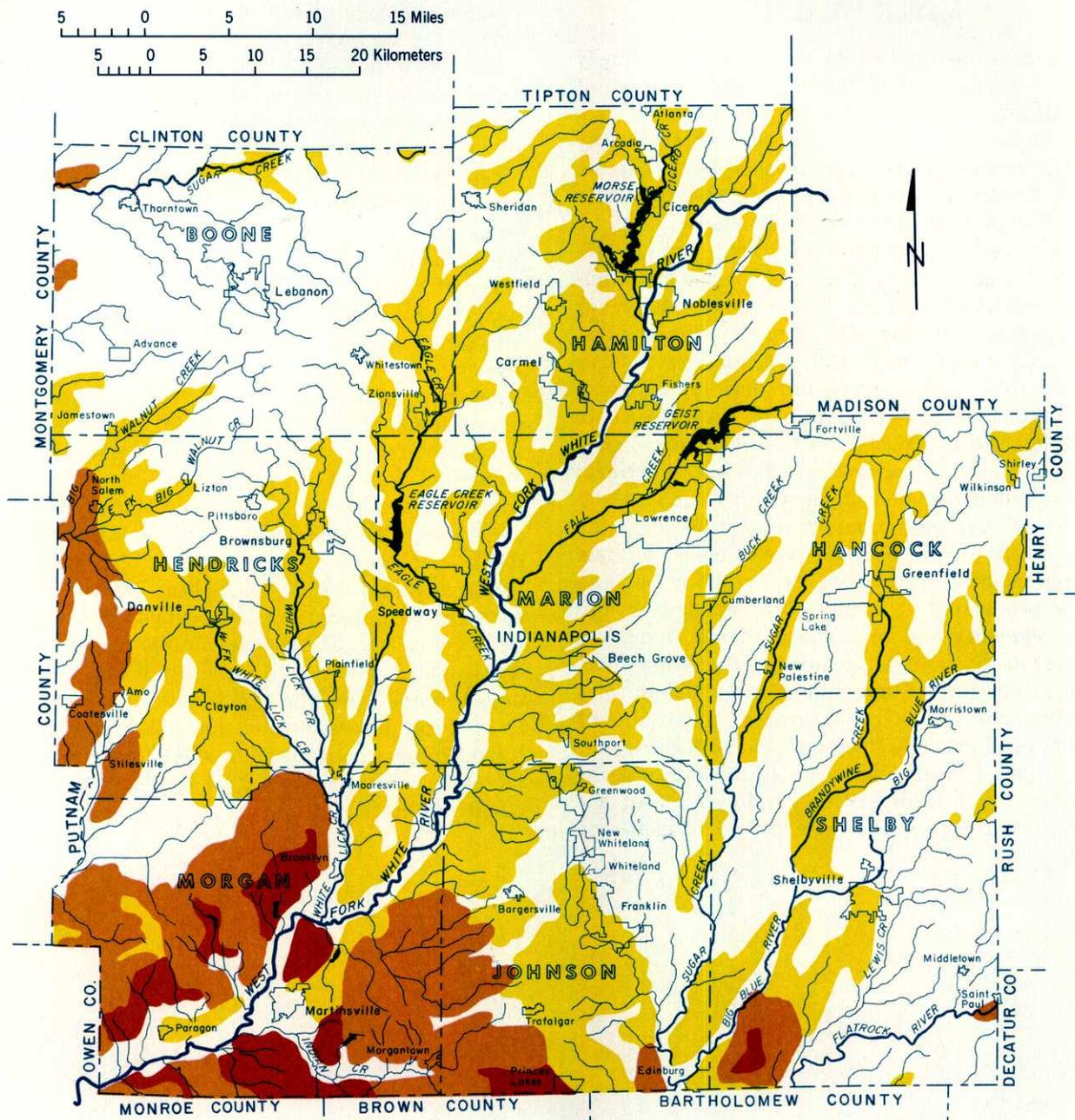
Figure 167
 Map of Region Eight showing the estimated average annual flood damages per mile along selected streams.



SOIL WETNESS CHARACTERISTICS

- Slight
- Moderate
- Severe

Figure 168
Map of Region Eight showing the location of the wetness characteristics of soil associations.



SOIL EROSION POTENTIAL

- Low
- Medium
- High
- Very high

Figure 169

Map of Region Eight showing the erosion potential of the soil associations.

WATER QUALITY

The surface streams within Region Eight routinely surveyed for water quality by the Indiana State Board of Health are White and Big Blue Rivers, and Fall, Cicero, Eagle, and Whitelick Creeks. Water quality standards for the region are established by the Stream Pollution Control Board regulation SPC IR-4, the Water Quality Standard for the State of Indiana.

The West Fork of the White River exhibited two different levels of water quality, one for the river upstream from Indianapolis, and one for the river downstream from Indianapolis. Temperatures and dissolved oxygen levels were within required standards upstream from Indianapolis, but dissolved oxygen levels often violated state standards downstream of Indianapolis. Nitrate levels and the biochemical oxygen demand were at acceptable levels both upstream and downstream of Indianapolis. This stream is designated for partial body contact recreation, thus the level of fecal coliform bacteria should meet the state standards for this designation. Fecal coliform bacteria levels were violated in March, April, and June in upstream segments and in January, March, June and November in downstream segments of the White River. The pH, a measure of the acidity and alkalinity of a substance, showed no violations of maximum or minimum standards in either segment of the river.

Samples from Cicero Creek, a major tributary of the West Fork of the White River, indicated that the biochemical oxygen demand, dissolved oxygen, and

ammonia nitrogen were at acceptable levels at the time of the survey.

Samples from Fall Creek indicated that temperature, dissolved oxygen, nitrate, and fecal coliform bacteria values were at acceptable levels. Neither the maximum nor minimum limits for pH were violated.

Samples from near the mouth of Eagle Creek indicated that the temperature and dissolved oxygen levels have met state standards. The biochemical oxygen demand levels have been abnormally high from August to December. The pH values of Eagle Creek sometimes fell below minimum standards. Ammonia nitrogen concentrations have exceeded desirable levels in the months July through November. Eagle Creek has been designated for partial body contact recreation, but fecal coliform levels from January through March failed to meet the necessary criteria.

Samples from Whitelick Creek indicated that dissolved oxygen concentrations occasionally fell below minimum acceptable levels. In addition, ammonia nitrogen concentrations exceeded desirable levels.

Samples from the Big Blue River indicated the dissolved oxygen and ammonia nitrogen concentrations were within acceptable levels. Although low concentrations of dissolved oxygen were measured downstream from the Shelbyville wastewater discharge, the depression did not violate in-stream dissolved oxygen concentration standards. However, the recreation criterion for partial body contact was frequently violated.